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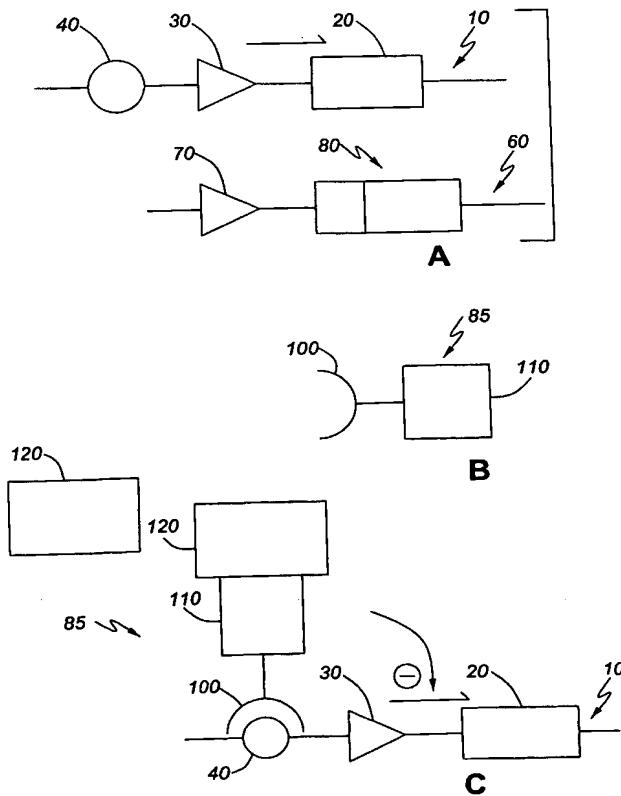
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[Continued on next page]

(54) Title: REGULATION OF GENE EXPRESSION USING CHROMATIN REMODELLING FACTORS



(57) Abstract: The invention provides a method to regulate expression of a gene of interest in a plant comprising, introducing into the plant a first nucleotide sequence comprising, the gene of interest operatively linked to a first regulatory region, and an operator sequence capable of binding a fusion protein, and a second nucleotide sequence comprising a second regulatory region in operative association with a nucleotide sequence encoding the fusion protein. The fusion protein comprising, a DNA binding protein, or a portion thereof, capable of binding the operator sequence, and a recruitment factor protein, or a portion thereof, capable of binding a chromatin remodelling protein. In this manner, expression of the second nucleotide sequence produces the fusion protein that regulates expression of the gene of interest.



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6 May 2004

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

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# INTERNATIONAL SEARCH REPORT

International Application No

PCT/CA 03/00822

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C12N15/67 C12N15/82 C12N15/54 C12N15/55 C12N15/90  
C12N9/10 C12N9/16 C12Q1/68 A01H5/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C12N A01H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, MEDLINE, BIOSIS, EMBASE, WPI Data, PAJ, Sequence Search

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 1 094 112 A (CANADA MAJESTY IN RIGHT OF) 25 April 2001 (2001-04-25)  paragraph [0010] paragraph [0044] paragraphs [0098] - [0100] claims 1-8,21,22  -----  BROWN C E C E ET AL: "The many HATs of transcription coactivators" TIBS TRENDS IN BIOCHEMICAL SCIENCES, ELSEVIER PUBLICATION, CAMBRIDGE, EN, vol. 25, no. 1, January 2000 (2000-01), pages 15-19, XP004186453 ISSN: 0968-0004 page 15, left-hand column, paragraph 2 - right-hand column, paragraph 2  -----  -/-	1-16,33, 34, 36-38,40
Y	-----  BROWN C E C E ET AL: "The many HATs of transcription coactivators" TIBS TRENDS IN BIOCHEMICAL SCIENCES, ELSEVIER PUBLICATION, CAMBRIDGE, EN, vol. 25, no. 1, January 2000 (2000-01), pages 15-19, XP004186453 ISSN: 0968-0004 page 15, left-hand column, paragraph 2 - right-hand column, paragraph 2  -----  -/-	1-16,33, 34, 36-38,40

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

\* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

Date of mailing of the international search report

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## INTERNATIONAL SEARCH REPORT

International Application No

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## C.(Continuation) DOCUMENTS CONSIDERED BE RELEVANT.

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	<p>WADE P A ET AL: "Histone acetylation: chromatin in action"  TIBS TRENDS IN BIOCHEMICAL SCIENCES, ELSEVIER PUBLICATION, CAMBRIDGE, EN, vol. 22, no. 4, 1 April 1997 (1997-04-01), pages 128-132, XP004058546  ISSN: 0968-0004  page 129, left-hand column, paragraph 4 - right-hand column, paragraph 1  table 1</p> <p>-----</p>	1-16,33, 34, 36-38,40
Y	<p>HAMPSEY M: "A SAGA of histone acetylation and gene expression"  TRENDS IN GENETICS, ELSEVIER SCIENCE PUBLISHERS B.V. AMSTERDAM, NL, vol. 13, no. 11, 1 November 1997 (1997-11-01), pages 427-429, XP004094468  ISSN: 0168-9525  page 427, middle column, paragraph 2 - right-hand column, paragraph 1</p> <p>-----</p>	1-16,33, 34, 36-38,40

# INTERNATIONAL SEARCH REPORT

International Application No.  
PCT/CA 03/00822

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely: .
2.  Claims Nos.: because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically: .
3.  Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1.  As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2.  As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3.  As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.: .
4.  No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:  
completely 1-16, 30-40 and, partially 19, 20, 28, 29

### Remark on Protest

The additional search fees were accompanied by the applicant's protest.  
 No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: completely 1-16, 30-40 and, partially 19, 20, 28, 29

Methods for regulating expression of a nucleic acid, or enhancing expression of a nucleic acid, or controlling transcription of a nucleic acid, or for increasing cold tolerance in a plant by using a first nucleic acid sequence encoding a gene of interest linked to a first regulatory region and a operator sequence capable of binding a fusion protein, and, a second nucleic acid sequence encoding a DNA binding protein and a recruitment factor protein.

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2. claims: completely 15-18, 21 and, partially 19, 20

A nucleic acid sequence encoding bnKCP1, and fragments thereof; a nucleic acid sequence encoding a fusion protein comprising bnKCP1; a method for regulating gene expression in a eukaryote using said nucleic acid.

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3. claim: 22

An isolated nucleic acid encoding a histone deacetylase-GAL4DB fusion protein.

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4. claims: completely 23-27 and, partially 28, 29

An isolated nucleic acid encoding BnSCL1, and fragments thereof; a method for regulating gene expression in a eukaryote using said nucleic acid.

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/CA 03/00822

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1094112	A 25-04-2001	CA 2316036 A1 EP 1094112 A2	27-02-2001 25-04-2001